

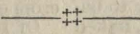
UNIVERSITY OF CALIFORNIA.

AGRICULTURAL EXPERIMENT STATION.

BERKELEY, CAL.

E. W. HILGARD, Director.

BULLETIN NO. 89.



DISTRIBUTION OF SEEDS AND PLANTS.

The heavy and continued storms of last winter interfered seriously with our seed distribution, partly because the stoppage of mails, in some places for long periods, discouraged applicants, and partly because even when seeds and plants were ordered and received, the unfavorable condition of the soil during the winter and the rush of other work in the spring precluded attention to experimental efforts. Still, considering the character of the season, the distribution was large and some supplies were exhausted before all applications were filled.

For this reason, and to accomodate newcomers to the State, and some older residents who are slow in hearing of or understanding this branch of our work, we are under the necessity of including in our announcement many things which have been distributed in previous years, as well as novelties. There is in our correspondence constant inquiry and demand for many seeds and plants which we had expected would before this have attracted the attention of commercial propagators, but apparently have not yet done so, hence they are continued in our distribution lists.

Terms.—As there is no appropriation available to meet the expenses of packing and postage, applicants are requested to send the amount specified in connection with each description below. If they desire seeds sent by express, applicants need not send the amounts specified for postage, *but all orders for seeds by express must be accompanied by a remittance of ten cents to pay for packing.* Applications may be made for one or more kinds of seeds, *but an applicant should not order more than one package of a kind.* In case any kind of seed becomes exhausted, the money sent will be returned unless a second choice is mentioned by the sender.

PLANTS will be forwarded by express (*charges to be paid by receiver*) in lots consisting of the number hereinafter mentioned for each kind, on remittance of 25 cents for each lot of plants. Postal notes are requested instead of stamps whenever practicable. Any surplus left after filling orders will, as far as possible, be returned to the senders, deducting letter postage.

CEREALS.

The establishment of outlying stations for culture experiments has afforded opportunity for trial of our collection of cereals under climatic conditions different from those prevailing

at Berkeley and in some respects more favorable to the growth of these grains. The following varieties have had one year's trial at Tulare and Paso Robles, in addition to several trials at Berkeley, and in most cases have demonstrated their value in these three regions. We commend them, therefore, with considerable confidence to those who desire to experiment in the search for varieties more hardy and prolific than those usually grown. The seed we distribute this year was grown at the Tulare Station. The supply is not large; applications will be filled in the order received so long as the supply lasts:

Wheats—

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|-----------------------|------------------------|
| 1. Arizona Indian. | 8. Pringle's Defiance. |
| 2. Archer's Prolific. | 9. Palestine. |
| 3. California Spring. | 10. Petali. |
| 4. Greek Atlanti. | 11. Whittington. |
| 5. Michigan Mixed. | 12. Volo. |
| 6. Missoyen. | 13. Hybrid Dattel. |
| 7. Pringle's Best. | |

The last named, No. 13, Hybrid Dattel, is a variety just received from the Department of Agriculture. Its origin and history are given in a letter from Hon. Edwin Willits, Assistant Secretary of Agriculture, dated Oct. 17, 1890, as follows:

"This Dattel is a cross between the Prince Albert and the Chiddam d'Antome, both parents, without question, being of English origin, but acclimated after a long series of years to France. The Chiddam is a very productive wheat with a rather small straw. The Prince Albert has a very long, large straw, very high, very leafy, strong and stiff. It is a variety of great development, productive in grain, and especially in straw. The Chiddam, as above said, has a very small straw. It came from the county of Sussex, in England. It is adapted to strong soil, providing it has a calcareous element. It is claimed for the Dattel that it has all the advantages of the Chiddam, so highly esteemed, and has besides a better straw. The claim has been justified by its cultivation in France."

Barleys—

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|----------------------------|----------------------|
| 1. Himalayan. | 6. Scotch Two-Rowed. |
| 2. Bluish. | 7. Kalina. |
| 3. Earliest Black-bearded. | 8. Manchurian. |
| 4. Large Naked Two-Rowed. | 9. Italian. |
| | 10. Nepalul. |
| | 11. Berkeley Hybrid. |

The last-named, 10, Berkeley Hybrid, originated on the grounds of the Berkeley Station. It has been so favorably reported upon by our correspondents, and so highly approved in our own experiments in Berkeley and at other stations as an exceptionally good hay barley, that we repeat from a previous bulletin its history, as follows:

"Several years ago two heads were noticed in a plot of Scotch two-rowed barley, which differed from that variety by absence of beards and in having spoon-like appendages like the Nepal barley, from which it also differs in being distinctly two-rowed and having the husk adhering to the kernel. This variety has been grown year after year, a continued effort being made to fix the type by eliminating all heads showing beards and those exhibiting a tendency to become four-rowed. In cleaning the seed, naked kernels have been removed as far as possible. The result is an approximation toward a fixed type which shall have the slender, leafy stem of the Scotch two-rowed, but beardless and with adhering husk. The primary object of the effort to fix this type has been to secure a variety suitable for hay like the Nepal, but less liable to rust than that sort."

Ryes—

1. Spanish. 3. St. John's Day.
2. Saxon Perennial. 4. Excelsior Winter.

The increasing popularity of rye as a winter feed for dairy cows in the interior, foothill and mountain valleys warrants experiment to determine if other varieties are better than the one commonly grown.

Oats: Rust-proof—

1. Heavy Winter. 2. Mox Rust-Proof.

We have secured a supply of these varieties from a reputable source in Georgia to determine if the success which Georgia oat-growers have attained in avoiding rust by choice of resistant varieties can be reproduced here. The "Heavy Winter" is commended to us as a heavy, tall oat which resists rust if sown early. "Mox Rust-Proof" very seldom shows any injury from rust, grows to medium height and is very productive. It is counted in Georgia as the "surest and only reliable spring oat."

Terms for Cereals.—Applicants for seeds of the cereals named above may order a single package of any one or of all varieties, but we cannot furnish more than a single package of one variety—15c. for each variety in 1 lb. sacks, postage paid.

TOBACCO.

In spite of the difficulties which have attended the curing and marketing of California-grown tobacco, quite encouraging progress has been made within the last few years, and it is possible that the crop may become of considerable importance. In view of this fact and to supply seeds of the best-known varieties to those desiring to experiment, we have secured from Major R. L. Ragland of Hyco, Virginia, seeds of his best sorts, viz.:

- 1—"Ragland's Conqueror"—a healthy, vigorous grower of the best form and texture and curing to the brightest color.
- 2—"Bonanza"—a superior variety for wrappers, cutters and fillers.
- 3—"Safrano"—yielding a product of a rich saffron color, soft silky texture and superior flavor.
- 4—"Gold-Finder"—a Yellow Oronoko cross-

ed on White Burley, and held by some planters to be the most beautiful yet produced.

5—"Ragland's Improved Yellow Oronoko"—developed by careful, continuous selection from old standard yellow Oronoko.

6—"Long-leaf Gooch"—leaf longer and finer than Broad-leaf Gooch, and considered one of the best varieties.

7—"Lacks"—broad leaf, tough fiber; a good and reliable sort.

8—"Bradley Broad Leaf"—a popular variety both for manufacturing and for cigars.

9—"Connecticut Seed Leaf"—the largest and finest selected varieties of this indispensable kind.

10—"Big Havana"—the best Americanized Havana; the earliest cigar variety, a heavy cropper and of fine texture and flavor.

Of these ten varieties, the first seven are of what is called the "commercial-leaf class"; the last three are cigar varieties. Experimenters may order the whole or part of the collection, as they see fit, at the rate of 3c for each variety, postpaid. Instructions for growing will be mailed to each applicant for the seed.

TREES AND PLANTS.

Seedling Olives.—Trees grown from imported seeds of six European varieties, which were planted in 1882, have borne freely this year. Some of these seedlings promise to be of value, and we desire to send scions for grafting to those inclined to experiment in this direction. *We do not commend these varieties for planting,* but simply invite experiment to secure a wider trial of them with a view of approving or condemning them.

No. 1—Resembles Rubra, fruit good sized, pit small, growth and fruiting good.

No. 2—Resembles Nigerina closely, very productive.

No. 3—Resembles Præcox; large bearer and a strong, upright grower.

No. 4—Another strong, upright grower, and productive.

No. 5—Resembles Atrovioleacea; early maturing, foliage rather open.

No. 6—Resembles Uvaria; good, compact grower, fruit-clusters large and abundant.

No. 7—Resembles Atrovioleacea; very open grower and fair bearer.

No. 8—Resembles Rubra in leaf and growth; fruit of good size.

Packages of these scions will be sent at the rate of 4c for each variety, postpaid.

Date Palms.—Some confusion and misunderstanding have followed the announcement, in the newspapers, that we had received from the U. S. Department of Agriculture a collection of the best varieties of foreign date palms. We have received only a few such palms, and they have all been planted at our stations at Tulare and Pomona. In the future there will be distribution of these, when they produce suckers. We have, however, a few plants grown from the seed of the date of commerce, which we will send to applicants in localities where the date is likely to prove hardy, in order that the local climates may be tested in advance of the distribution of better varieties. Two plants to each applicant, so long as the supply lasts, for 25c, by express.

Carobs.—In view of the continued inquiry for this forage-producing tree of the Mediterranean region, we have grown a small lot of seedlings for distribution this year. The Carob tree (*Ceratonia Siliqua*) is the true "Algaroba,"

or St. John's bread of the Mediterranean region, and has been heretofore recommended for cultivation in the southern part of the State, on dry and otherwise unavailable hillsides as well as in richer and moister lands, for the production of an excellent milk-producing feed. (See report College of Agriculture of 1884, page 100, and report 1886, page 108.) The Carob is about as hardy as the orange, but owing to its drouth-resisting qualities when once established, is destined to have a much wider range than that tree. Four plants to each, it being necessary to make sure of having both staminate and pistillate trees together; 25c by express.

Kai Apple (*Aberia Caffra*).—The Kai apple is a native of Natal and Caffaria. It is a tall shrub, yielding an edible fruit of a golden yellow color, about the size of a small apple. It is commended as a hedge plant, as it is densely clothed with strong dry spines. The leaves are small and of a rich green hue. The plant grows readily from seed, but can also be multiplied rapidly by cuttings, using bottom heat. In this way plants can be secured for hedge-planting without waiting for the stock plant to reach bearing age. We send by express two plants to each applicant: 25c.

Caper bush (*Capparis spinosa*).—It is possible that the production of the "carers" of commerce, which are the pickled flower-buds of this plant, may become one of our minor agricultural industries. The plant is a free bloomer with us from June to October; the flowers are strikingly beautiful and the foliage attractive. It is of low habit, and plants should be set at least six feet apart. Three plants to each applicant by express: 25c. Larger quantities can be furnished at cost of packing to those desiring to plant for trial on a commercial scale.

English Oak (*Quercus robur*, var. *pedunculata*).—Each year furnishes additional evidence of the exceedingly rapid and satisfactory growth of this tree in California. It can be earnestly commended for planting in most parts of the State, both upon lawns and in forest plantations. One-year-old trees by express, five to each applicant: 25c. Young trees should be guarded from gophers, squirrels and cattle—all these animals eat them greedily.

Black Wattle (*Acacia decurrens*).—This tree has demonstrated its adaptation to most California climates, is a rapid grower and very desirable as a shade or ornamental tree as well as for its economic importance as the source of the wattle-bark of commerce. Small trees sent out from the University are already bearing seed in several localities in the State. General success is reported with seed previously sent out where the seed has been put in boiling water and allowed to stand and cool 12 hours before planting. Otherwise the seed may not germinate until the second year. The seed is small, and a packet properly handled should give trees for a large plantation; 2c per packet by mail.

Licorice.—This important commercial plant has demonstrated its adaptation to California conditions, and offers inducements to those who have suitable lands. The importation of licorice from Europe to the United States is very large, and the market for the local product is promising. Mr. Isaac Lea of Florin, Sacramento county, our largest producer, obtains 14c per pound for dried medium-sized roots such as druggists use, and the manufacture of stick licorice would probably pay even better, if one would give the effort needed to succeed

in its production. Licorice produces best on low, moist ground. Land that is overflowed in winter suits it well, and submergence does not injure the plant. It will, however, grow on almost any soil. The roots should be planted in rows four feet apart, the roots placed one foot apart in the row and cultivated like corn. Harvesting is done by plowing out with a strong team or digging with spades. The plants which we send to each applicant will soon give roots enough to plant a large area if desired. Let it be remembered, however, that licorice in land which is desired for other purposes is a troublesome weed and hard to eradicate. We send five root cuttings to each applicant: 10c by mail, postpaid.

CUTTINGS AND SCIONS.

Osier Willows.—The demand for the choice varieties of Austrian Osier willows which we grew from cuttings received from the U. S. Dept. of Agriculture soon exhausted the supplies available last year. We have therefore produced a larger supply for this year's distribution.

No. 1: "Smooth Golden" (*Salix viminalis*)—rather a small, slim growth; bark smooth, bright yellow.

No. 2: "Belgian" (*S. viminalis*)—a stronger grower; bark greenish yellow.

No. 3: "Hybrid Viminalis" (*S. viminalis* var. ?)—very long canes; bark greenish yellow.

No. 4: "Improved Viminalis" (*S. viminalis meliorata*)—medium growth; bark greenish yellow.

No. 5: "Noble Viminalis" (*S. viminalis nobilis*)—a strong grower; bark greenish yellow.

No. 6: "Broad-leaved almond willow" (*S. amygdalina latifolia*)—rather a small cane with broad leaf; bark dark green; wood hard.

No. 7: "Yellow-branch almond willow" (*S. amygdalina vitellina*)—bark dark green.

No. 8: "Caucasian almond willow" (*S. amygdalina Caucasicum*)—bark black or very dark.

No. 9: "Silver-leaf willow" (*S. hippophaefolia*)—a strong grower, with reddish bark.

Sent in lots of 10 of a kind; 10c. per lot, or one dozen assorted, 20c. by mail.

Mulberries.—Cuttings of the following kinds can be had: (1) Multicaulis; (2) Alba; (3) Russian; (4) Downing's Ever-bearing; (5) Lhoo; (6) Nagasaki. Sent in lots of 10 of a kind; 10c. per lot, or 12 cuttings assorted, 20c. by mail.

Resistant Grape Vines.—These vines are not desirable for fruit-bearing, but are offered to those desiring to test them as stocks for grafting. Cuttings of the following species of *Vitis* can be had: (1) Cinerea; (2) Aestivalis; (3) Cordifolia; (4) Candicans; (5) Riparia; (6) Arizonica; (7) Californica; (8) Monticola; (9) Novo-Mexicana; (10) Rupestris; (11) Vulpina; (12) Romaneti; (13) Spino-vitis Davidii. Sent in lots of 10 of a kind; 10c. per lot, or a dozen assorted, 20c. by mail.

Fruit Tree Scions.—The University orchard contains upward of 500 named varieties of fruit, and our report on "Agricultural Experiment Stations," 1890, pages 182 to 187, contains a full list. This report will be sent to all applicants who may order any of the varieties named. We may not be able to supply all applications for some of the newer varieties, because the trees are small.

We do not furnish rooted trees, but scions, for

grafting. We do not send large quantities of any variety, because the object is to test varieties and not to furnish material for commercial propagation. Send 10c. for each dozen ordered of a single kind, or 20c. if a dozen of assorted varieties is ordered.

FORAGE PLANTS.

Texas Blue Grass (*Poa arachnifera*).—This grass can now be commended as especially valuable in many parts of the State. Experimenters who have received roots from us or from other sources agree in its favor. An interesting statement furnished us by Mr. Austin J. Roberts of San Leandro, Alameda county, after three years' growth of the grass, contains these points:

"It stands our warm dry summers without dying out, and springs into vigorous growth as soon as the rainy season commences. It has grown with me successfully even on a gravelly soil without a drop of water from May until October, yielding a crop of hay the ensuing summer at the rate of $2\frac{1}{2}$ tons to the acre. Planted on good soil and occasionally irrigated during the summer, its growth is luxuriant, affording many cuttings and producing an enormous yield of feed. It is highly relished by stock both in its green state and as hay. The roots planted in rows 18 inches apart and 12 inches apart in the rows, soon spread and form a matted turf."

We can furnish root-sets in 8-oz. packages for 8c. each by mail. By planting a small plot, the grower will soon have roots to plant a large area if the grass commends itself.

Other Forage Plants.—There is still demand for the forage plants which we have formerly distributed. Some of them have proved very successful and valuable. It is desirable to have as wide trial as possible of all of them:

Japanese Wheat grass (*Agropyrum japonicum*), 4-oz. packages, 4c.

Tall Oat grass (*Arrhenatherum avenaceum*), 4-oz. packages, 4c.

Schrader's Brome grass (*Bromus unioloides*), 8-oz. packages, 6c.

Hungarian Brome grass (*Bromus inermis*), 4-oz. packages, 4c.

Hairy-Flowered Paspalum (*Paspalum dilatatum*), 2-oz. packages, 2c.

Millet grass (*Milium multiflorum*), 2-oz. packages, 2c.

Snail clover (*Medicago turbinata*), 4-oz. packages, 4c.

Esparecet or Sainfoin (*Onobrychis sativa*), 4-oz. packages, 4c.

Jersey Kale—a tall-growing collard producing a vast weight of feed on moist land. Plants should be grown and set out like cabbages; 2-oz. packages, 2c.

FIBER PLANTS.

Cotton.—Cotton was more widely distributed in California last year than ever before, and excellent samples were produced. We have seed of two leading Texas varieties: "Big Boll" and "Poor Man's Relief." Seed in 8-oz. packages, 8c. each by mail.

Jute.—Adapted to moist lands away from the coast and should be sown after the ground is well warmed in the spring and danger of frost is over. Seed in 4-oz. packages, 4c. each.

New Zealand Flax (*Phormium tenax*).—Grows well in the coast regions of the State. Valuable for tying plants, vines, etc. Five plants to the lot; 25c. per lot by express.

Esparto Grass (*Stipa tenacissima*).—Grows well on sandy beaches within reach of salt water, and in some other situations. Used for cordage, basket-weaving and paper-making. Ten plants to the lot; 25c. per lot by express.

Ramie (*Boehmeria candicans*).—The famous "China grass." Several processes are now being advocated as successful in extracting the fiber, and some foresee an important industry resulting therefrom. Ten plants to the lot; 25c. per lot by express.

Flax.—Four varieties of the best European fiber flaxes, which attain about twice the length of stem of the variety grown for seed in this State. No. 1, White-flowering French; No. 2, Royal of Germany; No. 3, Russian; No. 4, Yellow-seeded; 4-oz. packages of each or all, 4c. each.

MISCELLANEOUS.

Beans.—"Tall Mont d'Or," an excellent variety; 4-oz. packages, 4c.

Beets.—"Eclipse" and "Osborn," very early and excellent; 4-oz. packages, 4c.

Sugar Beets.—In view of the renewed interest in the beet sugar industry, we will furnish seed of approved varieties in 4-oz. packages to those who desire to test their local conditions with reference to the production of beets acceptable to the sugar-makers. Growers of such trial beets can have the product assayed at the Station laboratory. Seed for large plantings can of course be obtained through commercial channels.

Spinach.—New Zealand (*Tetragonia expansa*); described by Von Mueller as a good culinary herb and as useful for restraining drifting sands. Seed in 1-oz. packets: 2c.

Chapman's Honey Plant.—A "globe thistle," much liked by bees and suitable for planting in waste places. Seed in 4-oz. packages, 4c.

Pyrethrum (Insect Powder plant).—The Dalmatian (*cinerarifolium*) and Red (*roseum*) in 1-oz. packages, 2c. each.

Bamboos.—A few applicants can be furnished with rooted plants of the *Metake*, one in a lot; 25c. per lot by express.

Reports from Recipients.—Those who receive seeds and plants are expected to report results to us, that the data may be embodied in our publications. A large number of such reports is now being prepared for printing, and we earnestly request those who have not yet complied with our desires in this respect to do so at once. We wish to hear of failures as well as successes, that the exact standing of each plant may be ascertained. In reporting failures, please state from what apparent cause, if possible.

N. B.—All applications for seeds and plants should be made as early as possible. We expect to send out seeds about *January 1st*, and plants about *FEBRUARY 1st*. All applications should be addressed to

December 10, 1890.

E. J. WICKSON,
Berkeley, Cal.